

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA16 | Ladbroke and Southam

Data appendix (AQ-001-016)

Air quality

November 2013

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Department
for Transport

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1 Introduction

1.1.1 The air quality appendices for the Ladbroke and Southam community forum area (CFA16) comprise:

- discussion of the policy framework (Section 2);
- baseline air quality data (Section 3);
- dust impact evaluation and risk rating (Section 4); and
- air quality assessment – road traffic (Section 5).

1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5 air quality map book.

2 Policy framework

- 2.1.1 Warwickshire County Council (WCC) works with the five districts and borough councils within Warwickshire (North Warwickshire, Nuneaton and Bedworth, Rugby, Warwick and Stratford-on-Avon) to address transport related air quality issues through measures in a local transport plan (LTP).
- 2.1.2 The Warwickshire Local Transport Plan¹, covering the period 2011-2026, includes an air quality strategy, which outlines a number of policies aimed at improving air quality across the county. The major themes of the air quality strategy are:
- to improve areas with poor air quality and maintain those areas that currently experience good air quality;
 - to encourage sustainable forms of transport, which reduce reliance on private vehicle use and minimises emissions to air; and
 - to promote awareness of alternative travel choices.
- 2.1.3 Policy AQA2 of the local transport plan air quality strategy, Improving Poor Air Quality through Partnership Working, is concerned with the preparation of air quality action plans (AQAP) and the implementation of traffic management improvements within air quality management areas (AQMA) and wider initiatives to change travel behaviour to encourage walking, cycling and the greater use of public transport.
- 2.1.4 Policy AQA3 of the local transport plan air quality strategy, Maintaining Areas of Good Air Quality, indicates that the lorry route map for Warwickshire will be reviewed every two to three years. This is potentially relevant to heavy duty vehicle (HDV) movements associated with the construction phase of the Proposed Scheme.
- 2.1.5 Policy AQ5 of the local transport plan air quality strategy, Integration of Air Quality and Transport Planning, states that WCC will provide input to the preparation of district and borough council local development frameworks (LDF) and to individual planning applications to negotiate appropriate air quality and transport improvements.
- 2.1.6 Stratford-on-Avon District Council (SADC) is the local planning authority for the Ladbroke and Southam area and its current adopted development plan is the Stratford-on-Avon District Local Plan Review 1996-2011².
- 2.1.7 At the request of the local planning authorities (LPAs), the Secretary of State has issued directions to save some of the policies from these adopted plans, to provide a basis for on-going development management decisions, pending the adoption of replacement, more up to date local plans.
- 2.1.8 The principal policy of relevance to air quality is saved Policy PR.8, Pollution Control. This policy does not permit development that would give rise to air, noise, light or water pollution, or soil contamination where the levels of discharges or emissions are

¹ Warwickshire County Council (2010/2011), *Warwickshire Local Transport Plan 2011-2026*.

² Stratford-on-Avon District Council (2006), *Stratford-on-Avon District Local Plan Review 1996-2011*.

sufficiently significant to cause harm to other land uses, health or the natural environment.

- 2.1.9 SADC is currently in the process of preparing a LDF, the first document of which will be the core strategy. A Draft Core Strategy document³ was published for consultation in February 2012 and the Council is currently preparing the pre-submission version of the core strategy, which will be subject to a final period of consultation before being submitted to the Secretary of State for examination. Given its advanced stage of preparation, the document represents a material consideration for the purposes of development management decisions.

³ Stratford-on-Avon District Council (2012), *Stratford-on-Avon District Local Development Framework Draft Core Strategy 2012*.

3 Baseline air quality data

3.1 Existing air quality

Local authority review and assessment information

- 3.1.1 Under Part IV of the Environment Act 1995, all local authorities are responsible for local air quality management (LAQM). Under the LAQM regime, a local authority is required to undertake regular review and assessment of local air quality, the findings of which are reviewed by the Department for Environment, Food and Rural Affairs (Defra) prior to publication.
- 3.1.2 If an area is identified as being unlikely to achieve an air quality standard and there are sensitive receptors to be exposed over the relevant exposure period, then the local authority is required to designate an AQMA and develop an AQAP to improve local air quality.
- 3.1.3 Within the SDC area there are two AQMAs. These AQMAs are not within the Ladbroke and Southam area.

Local air quality monitoring data

- 3.1.4 The following sections provide a summary of the recorded pollutant concentrations at these sites.
- 3.1.5 The pollutant concentrations can be compared to the air quality standards:
- $40\mu\text{g}/\text{m}^3$ as an annual mean for NO_2 and PM_{10} ;
 - $200\mu\text{g}/\text{m}^3$ one-hour mean for NO_2 not to be exceeded more than 18 times a year (equivalent to the 99.8th percentile of the one-hour mean);
 - $50\mu\text{g}/\text{m}^3$ 24-hour mean for PM_{10} not to be exceeded more than 35 times a year (equivalent to the 90.4th percentile of the 24-hour mean); and
 - $25\mu\text{g}/\text{m}^3$ as an annual mean for $\text{PM}_{2.5}$.

Continuous monitoring

- 3.1.6 SADC does not carry out any automatic continuous monitoring and there are no continuous monitoring stations within the Ladbroke and Southam area

Diffusion tubes

- 3.1.7 SADC measures annual mean nitrogen dioxide concentrations using passive diffusion tubes at 23 locations across its administrative area. The diffusion tubes are primarily located within the centre of Stratford-upon-Avon and the majority are located at roadside locations and therefore are not representative of the air quality near the Proposed Scheme.

Background pollutant concentrations

- 3.1.8 Estimates of background air quality have been obtained from Defra for 2011 and future years (2017 and 2026)⁴. These data are estimated for 1km grid squares for nitrogen oxides (NO_x), NO₂, PM₁₀ and PM_{2.5}. NO₂ annual mean concentrations ranged from 11µg/m³ to 14µg/m³ in 2012, PM₁₀ annual mean concentrations ranged from 15µg/m³ to 16µg/m³ in 2012 and PM_{2.5} concentrations ranged from 10µg/m³ to 11µg/m³ in 2012. Average pollutant concentrations are below the relevant air quality standards.
- 3.1.9 In the absence of continuous monitoring and relevant diffusion tube monitoring, the Defra background concentrations maps have been used to characterise the baseline air quality for the Ladbroke and Southam area. These maps indicate the average background pollutant concentrations across the Ladbroke and Southam area are below the relevant air quality standards.

Local emission sources

- 3.1.10 The main source of emissions of NO_x and PM₁₀ in the study area are road traffic emission from the A425 Leamington Road and A423 Banbury Road which cross the Proposed Scheme within the Ladbroke and Southam and also the A426 to the east of the Proposed Scheme within the Ladbroke and Southam area⁵. There are a number of permitted part A industrial processes⁶. These are intensive farming operation near Bishop's Itchington, approximately 2km south-west of the centre line of the Proposed Scheme; waste treatment operations near Southam, over 3km east of the centre line of the Proposed Scheme; cement and lime works near Southam, approximately 3km north-east of the centre line of the Proposed Scheme; and waste landfill operations near Ufton, approximately 1km south-west of the Proposed Scheme. Due to the nature of the emissions from these Part A Processes, it is unlikely that these will have an effect on local air quality within the Ladbroke and Southam area. Contributions to local pollutant concentrations made by these industrial installations are included within background concentrations used in the assessment.

3.2 Receptors

Human

- 3.2.1 Human receptors which are considered to be susceptible to changes in air quality due to construction or operation of the proposed scheme have been identified.

Construction phase

- 3.2.2 Human receptors that could potentially be affected by the construction phase of the Proposed Scheme are shown in Volume 5: Map AQ-02-016-01 and Map AQ-02-016-02 for receptors relevant to the construction dust assessment and Volume 5: Map AQ-01-016 for receptors relevant to the construction traffic emissions assessment. These include:

⁴ Department for Environment, Food and Rural Affairs; Background Maps; <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>; Accessed: July 2013.

⁵ Stratford-on-Avon District Council (2012), *Local Air Quality Management Updating and Screening Assessment*.

⁶ Identified from Environment Agency; What's in your backyard website; <http://www.environment-agency.gov.uk/default.aspx>; accessed April 2013. A Part A process is an industrial operation requiring a permit to operate from the Environment Agency under the Environmental Permitting regime, and as such is considered a significant source of pollution.

- Chapel Bank Cottages, Lower Radbourne;
- properties at Ladbroke Grove Farm, Windmill Lane, Ladbroke;
- properties around Starbold Farm on A423 Banbury Road, Southam;;
- properties around B4451 Kineton Road, Southam;
- properties along Warwick Road off A425 Leamington Road, Southam;
- around the A425 Leamington Road between Stoneythorpe and Southam; and
- Wood Farm Cottage, near Ufton.

Operational phase

3.2.3 Human receptors that could potentially be affected by the operation of the Proposed Scheme are shown in Volume 5: Map AQ-01-016. These include:

- properties around Starbold Farm, A423 Banbury Road, Southam; and
- properties around B4451 Kineton Road, Southam.

Ecological

Construction phase

3.2.4 One statutory designated ecological receptor has been identified within the Ladbroke and Southam area. This is Long Itchington and Ufton Woods site of special scientific interest (SSSI), located at Bascote Heath. This site has been identified based on its potential sensitivity to dust deposition and its proximity to dust generating earthworks and construction activities associated with the Proposed Scheme. The Long Itchington Wood Tunnel passes under this SSSI. There are no non-statutory designated sites within the Ladbroke and Southam area that could potentially be affected by changes in air quality as a result of the Proposed Scheme.

Operational phase

3.2.5 No ecological receptors with a statutory designation or non-statutory designation that could potentially be affected by the operation of the Proposed Scheme have been identified within the Ladbroke and Southam area.

4 Dust impact evaluation and risk rating

- 4.1.1 The following tables provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance⁷. Where considered useful to identify receptors and their relationship to the construction activity, a specific figure is provided.
- 4.1.2 The construction activities considered were demolition; the construction of new structures; earthworks, including the movement of materials on the haul road along the line of the Proposed Scheme; and dust and mud deposited onto public highways from vehicles travelling to and from construction areas (referred to as trackout in the IAQM guidance).

Table 1: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Chapel Bank Cottages, Lower Radbourne (Map AQ-02-016-01 Figure 16.1)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	Properties more than 20m from earthworks and over 100m from the haul road Total area of earthworks greater than 10,000m ² More than 10 heavy earth moving vehicles on haul road per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months
Construction	20m-50m	Large	High	Low	Negligible	Properties more than 20m from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

⁷ IAQM (2012), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Ladbroke Grove Farm, Windmill Lane, Ladbroke (Map AQ-02-016-01 Figure 16.2)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	100m-200m	Large	Medium	Low	Negligible	Properties more than 20m from earthworks and more than 100m from the haul road Total area of earthworks greater than 10,000m ² More than 10 heavy earth moving vehicles on haul road per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months
Construction	50m-100m	Large	Medium	Low	Negligible	Properties more than 20m from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
Properties around Starbold Farm on A423 Banbury Road, Southam (Map AQ-02-016-01 Figure 16.3)						
Demolition	20m-100m	Large	High	Low	Negligible	Properties 20m away from demolition Total volume of demolition 50,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of demolition expected more than 12 months
Earthworks	50m-100m	Large	Medium	Low	Negligible	Properties more than 20m from earthworks and haul road Total area of earthworks greater than 10,000m ² More than 10 heavy earth moving vehicles on haul road per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	20m-50m	Large	High	Low	Negligible	Properties more than 20m from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	20m-50m	Large	High	Low	Negligible	Properties more than 20m away from trackout route Over 100 HDV trips per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of trackout expected to be more than 12 months
Properties around B4451 Kineton Road, Southam (Map AQ-02-016-01 Figure 16.4)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	Properties more than 20m from earthworks and haul road More than 10 heavy earth moving vehicles on haul road per day Total area of earthworks greater than 10,000m ² Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months
Construction	Less than 20m	Large	High	High	Slight adverse	Properties 16m away from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Trackout	20m-50m	Medium	Medium	Low	Negligible	Properties more than 20m away from trackout 25-100 HDV trips per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of trackout expected to be more than 12 months
Properties along Warwick Road off A425 Leamington Road, Southam (Map AQ-02-016-02 Figure 16.5)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m
Construction	n/a	n/a	n/a	n/a	n/a	No construction within 350m
Trackout	Less than 20m	Large	High	High	Slight adverse	Properties 18m away from trackout route Over 100 HDV trips per day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of trackout expected to be more than 12 months
Stoneythorpe Lodge, A425 Leamington Road, Southam (Map AQ-02-016-02 Figure 16.6)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	50m-100m	Large	Medium	Low	Negligible	Properties more than 20m from earthworks and haul road More than 10 heavy earth moving vehicles on haul road per day Total area of earthworks greater than 10,000m ² Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	Less than 20m	Large	High	High	Slight adverse	Properties less than 20m away from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	20m-50m	Large	Medium	Low	Negligible	Properties more than 20m from trackout route Over 100 HDV trips in any one day Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of trackout expected to be more than 12 months
Wood Farm Cottage, near Ufton (Map AQ-02-016-02 Figure 16.7)						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	200m-350m	Large	Low	Low	Negligible	Properties more than 20m from earthworks Total area of earthworks greater than 10,000m ² Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months
Construction	200m-350m	Large	Low	Low	Negligible	Properties more than 20m from construction Total volume of construction greater than 100,000m ³ Baseline PM ₁₀ concentrations less than 75% of air quality standard Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
Long Itchington and Ufton Woods SSSI						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Appendix AQ-001-016 | Dust impact evaluation and risk rating

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	Less than 20m	Large	Medium	High	Negligible	<p>Ecological site with national designation</p> <p>Less than 20m from earthworks</p> <p>Total area of earthworks greater than 10,000m²</p> <p>Baseline PM₁₀ concentrations less than 75% of air quality standard</p> <p>Duration of Earthworks expected to be more than 12 months</p>
Construction	Less than 20m	Large	Medium	High	Negligible	<p>Ecological site with national designation</p> <p>Less than 20m from construction</p> <p>Total volume of construction greater than 100,000m³</p> <p>Baseline PM₁₀ concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

Table 2: Summary of construction dust impacts and effects

Location	Magnitude of impact (with CoCP mitigation measures)	Effect of dust-generating activities	Additional mitigation
Chapel Bank Cottage, Lower Radbourne	Negligible	Not significant	None required
Ladbroke Grove Farm, Windmill Lane, Ladbroke	Negligible	Not significant	None required
Properties around Starbold Farm on A423 Banbury Road, Southam	Negligible	Not significant	None required
Properties around B4451 Kineton Road, Southam	Slight adverse	Not significant	None required
Properties along Warwick Road off A425 Leamington Road, Southam	Slight adverse	Not significant	None required
Stoneythorpe Lodge, A425 Leamington Road, Southam	Slight adverse	Not significant	None required
Wood Farm Cottage, near Ufton	Negligible	Not significant	None required
Long Itchington and Ufton Woods SSSI	Negligible	Not significant	None required

5 Air quality assessment road traffic

5.1 Overall assessment approach

- 5.1.1 The air quality assessment for road related emissions has used three different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges⁸ (DMRB) thresholds detailed in the SMR (Volume 5: Appendix CT-001-000/1) will not be exceeded, any additional assessment is not required as the air quality impacts will be minimal. If these thresholds are breached, then an assessment has been carried out.
- 5.1.2 If it is considered unlikely that air quality standards will be exceeded and the road configuration is a simple one, then the DMRB screening method has been used to predict changes in air quality. Where there will be a risk of standards being exceeded, where the road layout is considered to be complex or where the use of the DMRB screening method has indicated that there will be a potential exceedance of air quality standards, then the atmospheric dispersion model ADMS-Roads has been used for the assessment. Professional judgment has been used to select the appropriate tool for each area.
- 5.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the assessment as baseline air quality will be below air quality standard, there is a simple road layout and there are limited numbers of receptors close to roads affected during construction and operation of the Proposed Scheme.

5.2 Construction traffic model

- 5.2.1 Construction traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The construction scenario used traffic data from the year of maximum intensity of construction (2021) but assumed this would occur in the first year of construction (2017).
- 5.2.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. Two locations within the Ladbroke and Southam area met the criteria for assessment of change in traffic emissions during the construction phase. These locations were the A423 Banbury Road and the A425 Leamington Road. The increase in construction traffic was sufficient to require assessment at receptors along the A423 Banbury Road, between Southam and Watergall, and there will be a temporary diversion of the A425 Leamington Road which required assessment at receptors along the A425 Leamington Road. No locations were identified as requiring assessment due to construction traffic movements on the haul road.

Receptors assessed

- 5.2.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for quantitative assessment. These included locations representative of highest concentrations along the roads, including closest to

⁸ Highways Agency (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*.

junctions or to the road itself. Receptors assessed are listed in Table 3 and shown in Volume 5: Map AQ-01-016.

Table 3: Modelled receptors (construction phase)

Receptor	Description/Location	Ordnance Survey coordinates
16-1	Manor Farm Cottage, Watergall, Southam (A423 Banbury Road)	442655,255906
16-2	1 Hodnell Cottages, Ladbroke (A423 Banbury Road)	441952,257595
16-3	Yew Tree Cottage, Ladbroke (A423 Banbury Road)	441888,258568
16-4	The Oaks, Banbury Road, Southam	441774,259990
16-5	Starbold House Farm, Banbury Road, Southam	441515,259991
16-6	Harp Farm, Banbury Road, Southam	441719,260050
16-7	Stoneythorpe Lodge, Southam (along the A425 Leamington Road)	440098,261722
16-8	Home Farm, Stoneythorpe, Southam (along the A425 Leamington Road)	439811,262074

Background concentrations

5.2.4 The background concentrations used in the assessment are shown in Table 4 taken from the Defra Maps.

Table 4: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
16-1 (Manor Farm Cottage)	12.6	9.4	14.1
16-2 (1 Hodnell Cottages)	13.3	9.9	15.3
16-3 (Yew Tree Cottage)	13.5	10.0	14.9
16-4 (The Oaks)	13.7	10.1	15.5
16-5 (Starbold House Farm)	13.7	10.1	15.5
16-6 (Harp Farm)	15.5	11.3	16.3
16-7 (Stoneythorpe Lodge)	13.5	10.0	14.0
16-8 (Home Farm)	12.8	9.5	14.1

DMRB model results

5.2.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the Environmental Protection UK (EPUK) methodology⁹.

⁹ Environmental Protection UK (EPUK) (2010), *Development Control: Planning for Air Quality*.

Table 5: Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
16-1 (Manor Farm Cottage)	15.5	12.9	13.8	0.9	Small increase	Negligible
16-2 (1 Hodnell Cottages)	15.8	13.1	13.9	0.8	Small increase	Negligible
16-3 (Yew Tree Cottage)	14.6	12.0	12.5	0.5	Small increase	Negligible
16-4 (The Oaks)	13.5	11.0	11.2	0.2	Imperceptible	Negligible
16-5 (Starbold House Farm)	12.6	10.2	10.2	0.0	Imperceptible	Negligible
16-6 (Harp Farm)	17.9	14.7	15.6	0.9	Small increase	Negligible
16-7 (Stoneythorpe Lodge)	16.0	13.5	14.3	0.8	Small increase	Negligible
16-8 (Home Farm)	11.3	9.6	10.3	0.7	Small increase	Negligible

Table 6: Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
16-1 (Manor Farm Cottage)	15.4	14.6	14.7	0.1	Imperceptible	Negligible
16-2 (1 Hodnell Cottages)	16.6	15.7	15.8	0.1	Imperceptible	Negligible
16-3 (Yew Tree Cottage)	16.0	15.2	15.3	0.1	Imperceptible	Negligible
16-4 (The Oaks)	16.4	15.6	15.7	0.1	Imperceptible	Negligible
16-5 (Starbold House Farm)	16.3	15.5	15.5	0.0	Imperceptible	Negligible
16-6 (Harp Farm)	17.7	16.8	16.9	0.1	Imperceptible	Negligible
16-7 (Stoneythorpe Lodge)	15.4	14.5	14.7	0.2	Imperceptible	Negligible
16-8 (Home Farm)	14.8	14.1	14.2	0.1	Imperceptible	Negligible

5.2.6 Annual mean NO₂ and PM₁₀ concentrations will be below the air quality standards both with and without the Proposed Scheme for the construction phase. The hourly mean NO₂ air quality standard will also be met as annual mean NO₂ concentrations will be well below 60µg/m³. In addition the daily mean PM₁₀ air quality standard will also be met. It is not possible to model PM_{2.5} using the DMRB screening model, but given the PM₁₀ concentrations, the annual mean PM_{2.5} concentrations will be below the air quality standard.

5.2.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. There will be a small increase in NO₂ concentrations at Manor Farm Cottage, 1 Hodnell Cottages, Yew Tree Cottage and Harp Farm due to the increase in construction traffic on the A423 Banbury Road. At Stoneythorpe Lodge and Home Farm there will be a small increase in NO₂ concentrations due to the temporary realignment of A425 Leamington Road

closer to the receptors. The change in PM₁₀ concentrations is imperceptible at all receptors.

- 5.2.8 The magnitude of impact will be negligible at all receptors for NO₂ and PM₁₀.

Assessment of significance

- 5.2.9 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology⁹, the following points are noted:

- the magnitude of impact is negligible for NO₂ and PM₁₀ at all receptors;
- pollutant concentrations will be well below the air quality standards for both NO₂ and PM₁₀ with and without the Proposed Scheme.

- 5.2.10 Based on the above, the effect on air quality due to construction traffic emission will not be significant

5.3 Operational traffic model

- 5.3.1 Operational traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The operational scenario used traffic data from the first year of opening of the Proposed Scheme (2026).

- 5.3.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. Two locations within the Ladbroke and Southam area met the criteria for assessment of operational traffic emissions. These locations were the A423 Banbury Road, Southam and the B4451 Kineton Road, Southam. There will permanent road realignments of the A423 Banbury Road and the B4451 Kineton Road which required assessment at receptors around these roads.

Receptors assessed

- 5.3.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for qualitative assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are listed in Table 7 and shown in Volume 5: Map AQ-01-016.

Table 7: Modelled receptors (operational phase)

Receptor	Description/Location	Ordnance Survey coordinates
16-4	The Oaks, Banbury Road, Southam	441774,259990
16-5	Starbold House Farm, Banbury Road, Southam	441515,259991
16-6	Harp Farm, Banbury Road, Southam,	441719,260050
16-9	Field Cottage, Station Road, Southam,	440928,260748

Background concentrations

- 5.3.4 The background concentrations used in the assessment are shown in Table 8 taken from the Defra maps.

Table 8: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NOx	NO ₂	PM ₁₀
16-4 (The Oaks)	10.4	7.8	14.8
16-5 (Starbold House Farm)	10.4	7.8	14.8
16-6 (Harp Farm)	12.2	9.1	15.6
16-9 (Field Cottage)	10.3	7.8	13.8

DMRB model results

- 5.3.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor are also derived following the EPUK methodology⁹.

Table 9: Summary of DMRB annual mean NO₂ results (operational phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)		Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
16-4 (The Oaks)	8.7	8.0	-0.7	Small decrease	Negligible
16-5 (Starbold House Farm)	7.9	8.3	0.4	Small increase	Negligible
16-6 (Harp Farm)	12.4	9.5	-2.9	Medium decrease	Negligible
16-9 (Field Cottage)	9.8	8.2	-1.6	Small decrease	Negligible

Table 10: Summary of DMRB annual mean PM₁₀ results (operational phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)		Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
16-4 (The Oaks)	14.9	14.8	-0.1	Imperceptible	Negligible
16-5 (Starbold House Farm)	14.8	14.9	0.1	Imperceptible	Negligible
16-6 (Harp Farm)	16.1	15.7	-0.4	Small decrease	Negligible
16-9 (Field Cottage)	14.1	13.9	-0.2	Imperceptible	Negligible

- 5.3.6 Annual mean NO₂ and PM₁₀ concentrations will be below the air quality standards both with and without the Proposed Scheme for the operation phase. The hourly mean NO₂ air quality standard will also be met as annual mean NO₂ concentrations will be well below 60 $\mu\text{g}/\text{m}^3$. In addition the daily mean PM₁₀ air quality standard will also be met. It is not possible to model PM_{2.5} using the DMRB screening model, but given the PM₁₀ concentrations, the annual mean PM_{2.5} concentrations will be below the air quality standard.
- 5.3.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. There will be a small

decrease in NO₂ concentrations at The Oaks and a medium decrease at Harp Farm due to the permanent realignment of A423 Banbury Road further from these receptors. There will be a small increase in concentrations at Starbold Farm which is also on the A423 Banbury Road, but at this receptor location, the permanent realignment of the A423 Banbury Road moves the road closer to the receptor. At Field Cottage there will be a small decrease in NO₂ concentrations due to the permanent realignment of B4451 Kineton Road further from this receptor. The change in PM₁₀ concentrations is imperceptible at all receptors, with the exception of Harp Farm where there will be a small decrease in PM₁₀ concentrations due to the permanent realignment of A423 Banbury Road further from this receptor.

- 5.3.8 The magnitude of impact will be negligible at the receptor for NO₂ and PM₁₀.

Assessment of significance

- 5.3.9 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology⁹, the following points are noted:

- the magnitude of impact is negligible for NO₂ and PM₁₀ at all receptors;
- pollutant concentrations will be well below the air quality standards for both NO₂ and PM₁₀ with and without the Proposed Scheme.

- 5.3.10 Based on the above, the effect on air quality due to operational traffic emissions will not be significant.

6 References

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